CLAIMS

WHAT IS CLAIMED:

1. A method for utilizing seismic data contemporaneously across multiple seismic domains, the method comprising kinematically linking a first point in a set of seismic data having at least three-dimensions in a first seismic domain with a second point in the set of seismic data in a second seismic domain related to the first seismic domain by a velocity model in time or in depth.

2. The method of claim 1, further comprising visualizing the first and second seismic domains.

3. The method of claim 2, wherein kinematically linking the first point with the second point includes linking a cursor in the first seismic domain to a cursor in the second seismic domain.

4. The method of claim 1, further comprising commonly navigating between the first and second seismic domains over the kinematic link.

5. The method of claim 1, further comprising interpreting the seismic data.

6. The method of claim 1, wherein:

one of the first and second seismic domains comprises un-migrated post-stack time and the other one of the first and second seismic domains comprises post-stack depth;

one of the first and second seismic domains comprises migrated post-stack time and the other one of the first and second seismic domains comprises post-stack depth;

one of the first and second seismic domains comprises pre-stack time and the other one of the first and second seismic domains comprises depth;

one of the first and second seismic domains comprises post-stack depth and the second seismic domain comprises depth;

one of the first and second seismic domains comprises post-stack depth and the other one of the first and second seismic domains comprises re-migrated post-stack depth;

one of the first and second seismic domains comprises pre-stack time and the other one of the first and second seismic domains comprises pre-stack depth ;

one of the first and second seismic domains comprises raw pre-stack time and the other one of the first and second seismic domains comprises migrated pre-stack time;

one of the first and second seismic domains comprises pre-stack acoustic and the other one of the first and second seismic domains comprises pre-stack converted ; or

one of the first and second seismic domains comprises a set of four-dimensional seismic data from a first vintage and the other one of the first and second seismic domains comprises a set of four-dimensional seismic data from a second vintage.

7. The method of claim 1, wherein the velocity model comprises an acoustic velocity model, an elastic velocity model, being they isotropic or an anisotropic velocity model.

8. The method of claim 1, wherein the dynamic conversion mechanism comprises a vertical stretch, zero-offset conversion, image ray conversion, multi-offset conversion, elastic conversion, or four-dimensional conversion type of mechanism.

9. The method of claim 1, wherein kinematically linking the first point to the second point includes applying a kinematic conversion mechanism of the same type as the dynamic conversion mechanism to the first point.

10. The method of claim 9, wherein the kinematic conversion mechanism comprises one of a vertical stretch, a ray tracing, or an Eikonal wave front reconstruction.

11. The method of claim 1, further comprising pre-computing or computing on the fly a kinematic conversion between at least a portion of the data points in the first seismic and a portion of the data points in the second seismic domain.

12. The method of claim 1, further comprising kinematically linking the first point with a second point in the set of seismic data in a second seismic domain related to the first seismic domain by a velocity model in time or in depth.

13. The method of claim 1, wherein kinematically linking the first point with the second point comprises kinematically linking the first point point-to-point with the second point.

14. The method of claim 1, kinematically linking the first point with the second point comprises kinematically linking the first point surface patch-by-surface patch with the second point.

15. A program storage medium encoded with instructions that, when executed by a computer, perform a method for utilizing seismic data contemporaneously across multiple seismic domains, the method comprising kinematically linking a first point in a set of seismic data having at least three-dimensions in a first seismic domain with a second point in the set of seismic data in a second seismic domain related to the first seismic domain by a velocity model in time or in depth.

16. The program storage medium of claim 15, wherein the encoded method further comprises visualizing the first and second seismic domains.

17. The program storage medium of claim 15, wherein the velocity model in the encoded method comprises an acoustic velocity model, an elastic velocity model, being they isotropic or an anisotropic velocity model.

18. The program storage medium of claim 15, wherein the dynamic conversion mechanism of the velocity model in the encoded method comprises a vertical stretch, zero-offset conversion, image ray conversion, multi-offset conversion, elastic conversion, or four-dimensional conversion type of mechanism.

19. The program storage medium of claim 15, wherein kinematically linking the first point to the second point in the encoded method includes applying a kinematic conversion mechanism of the same type as the dynamic conversion mechanism of the velocity model to the first point.

20. The program storage medium of claim 15, wherein the encoded method further comprises pre-computing or computing on the fly a kinematic conversion between at least a portion of the data points in the first seismic and a portion of the data points in the second seismic domain.

21. The program storage medium of claim 15, wherein the encoded method further comprises kinematically linking the first point with a second point in the set of seismic data in a second seismic domain related to the first seismic domain by a velocity model in time or in depth.

22. The program storage medium of claim 15, wherein kinematically linking the first point with the second point in the encoded method comprises kinematically linking the first point point-to-point with the second point.

23. The program storage medium of claim 15, kinematically linking the first point with the second point in the encoded method comprises kinematically linking the first point surface patch-by-surface patch with the second point.

24. A computer programmed to perform a method for utilizing seismic data contemporaneously across multiple seismic domains, the method comprising kinematically linking a first point in a set of seismic data having at least three-dimensions in a first seismic domain with a second point in the set of seismic data in a second seismic domain related to the first seismic domain by a velocity model in time or in depth.

25. The computer of claim 24, wherein the encoded method further comprises visualizing the first and second seismic domains.

26. The computer of claim 24, wherein the velocity model in the encoded method comprises an acoustic velocity model, an elastic velocity model, being they isotropic or an anisotropic velocity model.

27. The computer of claim 24, wherein the dynamic conversion mechanism of the velocity model in the encoded method comprises a vertical stretch, zero-offset conversion, image ray conversion, multi-offset conversion, elastic conversion, or four-dimensional conversion type of mechanism.

28. The computer of claim 24, wherein kinematically linking the first point to the second point in the encoded method includes applying a kinematic conversion mechanism of the same type as the dynamic conversion mechanism of the velocity model to the first point.

29. The computer of claim 24, wherein the encoded method further comprises pre-computing or computing on the fly a kinematic conversion between at least a portion of the data points in the first seismic and a portion of the data points in the second seismic domain.

30. The computer of claim 24, wherein the encoded method further comprises kinematically linking the first point with a second point in the set of seismic data in a second seismic domain related to the first seismic domain by a velocity model in time or in depth.

31. The computer of claim 24, wherein kinematically linking the first point with the second point in the encoded method comprises kinematically linking the first point point-to-point with the second point.

32. The computer of claim 24, kinematically linking the first point with the second point in the encoded method comprises kinematically linking the first point surface patch-by-surface patch with the second point.

33. A method for visualizing a set of seismic data in multiple seismic domains, comprising:

visualizing the seismic data in a first seismic domain;

visualizing the seismic data in a second seismic domain, the second seismic domain being related to the first seismic domain by a velocity model in time or depth and an appropriate conversion mechanism; and

kinematically linking the first and second seismic domains through a kinematic conversion mechanism of the same type as the dynamic conversion mechanism used to generate the second seismic data from the first seismic data based on the appropriate velocity model.

34. The method of claim 33, further comprising visualizing the first and second seismic domains.

35. The method of claim 33, wherein the velocity model comprises an acoustic velocity model, an elastic velocity model, being they isotropic or an anisotropic velocity model.

36. The method of claim 33, wherein the dynamic conversion mechanism comprises a vertical stretch, zero-offset conversion, image ray conversion, multi-offset conversion, elastic conversion, or four-dimensional conversion type of mechanism.

37. The method of claim 33, wherein kinematically linking the first and second seismic domains includes applying a kinematic conversion mechanism of the same type as the dynamic conversion mechanism of the velocity model to the first seismic domain.

38. The method of claim 33, further comprising kinematically linking the first and second seismic domains in the set of seismic data in a second seismic domain related to the first seismic domain by a velocity model in time or in depth.

39. The method of claim 33, wherein kinematically linking the first and second seismic domains comprises kinematically linking the first seismic domain point-to-point with the second seismic domain.

40. The method of claim 33, kinematically linking the first and second seismic domains comprises kinematically linking the first seismic domain surface patch-by-surface patch with the second seismic domain.

41. A method for detecting discrepancies in three-dimensional seismic data between multiple seismic domains thereof, comprising:

kinematically linking a first seismic domain of the seismic data to a second seismic domain of the data;

kinematically linking the second seismic domain to a third seismic domain and

comparing the first seismic domain to the third seismic domain over the kinematic link between the first and second seismic domains and over the kinematic link between the second and third seismic domains; and

detecting discrepancies between the first and third seismic domains as a consequence of the comparison.

42. The method of claim 41, further comprising visualizing the first seismic domain, the second seismic domain, and the third seismic domain.

43. The method of claim 41, wherein linking the first and second seismic domains or linking the second and third seismic domains includes employing an acoustic velocity model, an elastic velocity model, being they isotropic or an anisotropic velocity model.

44. The method of claim 41, wherein the linking the first and second seismic domains or linking the second and third seismic domains includes employing a dynamic conversion

mechanism comprising a vertical stretch, zero-offset conversion, image ray conversion, multi-offset conversion, elastic conversion, or four-dimensional conversion type of mechanism.

45. The method of claim 41, wherein kinematically linking the first and second seismic domains includes applying a kinematic conversion mechanism of the same type as the dynamic conversion mechanism of the velocity model to the first seismic domain.

46. The method of claim 41, further comprising kinematically linking the first and second seismic domains in the set of seismic data in a second seismic domain related to the first seismic domain by a velocity model in time or in depth.

47. The method of claim 41, wherein kinematically linking the first and second seismic domains comprises kinematically linking the first seismic domain point-to-point with the second seismic domain.

48. The method of claim 41, kinematically linking the first and second seismic domains comprises kinematically linking the first seismic domain surface patch-by-surface patch with the second seismic domain.

49. A method for accumulating complementary information extracted from multiple seismic domains of a set of seismic data, comprising:

interpreting a first seismic domain of the seismic data;

kinematically linking the first seismic domain to a second seismic domain of the seismic data;

seeding the second seismic domain with the interpretation of the first seismic domain;

hunting for complementary information in the second seismic domain; and

persisting the complementary information to the first seismic domain.

50. The method of claim 49, further comprising visualizing the first and second seismic domains.

51. The method of claim 49, wherein the velocity model comprises an acoustic velocity model, an elastic velocity model, being they isotropic or an anisotropic velocity model.

52. The method of claim 49, wherein the dynamic conversion mechanism comprises a vertical stretch, zero-offset conversion, image ray conversion, multi-offset conversion, elastic conversion, or four-dimensional conversion type of mechanism.

53. The method of claim 49, wherein kinematically linking the first and second seismic domains includes applying a kinematic conversion mechanism of the same type as the dynamic conversion mechanism of the velocity model to the first seismic domain.

54. The method of claim 49, further comprising kinematically linking the first and second seismic domains in the set of seismic data in a second seismic domain related to the first seismic domain by a velocity model in time or in depth.

55. The method of claim 49, wherein kinematically linking the first and second seismic domains comprises kinematically linking the first seismic domain point-to-point with the second seismic domain.

56. The method of claim 49, kinematically linking the first and second seismic domains comprises kinematically linking the first seismic domain surface patch-by-surface patch with the second seismic domain.

57. The method of claim 49, further comprising:

reinterpreting the first seismic domain of the seismic data, including the information persisted from the second seismic domain;

kinematically linking the first seismic domain to a third seismic domain of the seismic data;

seeding the third seismic domain with the reinterpretation of the first seismic domain;

hunting for additional complementary information in the third seismic domain; and

persisting the additional complementary information to the first seismic domain.

58. A method for improving the exploitation of information extracted from a multi fold seismic data, comprising:

kinematically linking a multi-fold seismic domain of the seismic data to an equivalent one fold seismic domain;

rearranging the data of the multi-fold seismic domain in light of the information identified in the one fold seismic domain.

59. The method of claim 58, further comprising visualizing the multi-fold and single-fold seismic domains.

60. The method of claim 58, wherein the velocity model comprises an acoustic velocity model, an elastic velocity model, being they isotropic or an anisotropic velocity model.

61. The method of claim 58, wherein the dynamic conversion mechanism comprises a vertical stretch, zero-offset conversion, image ray conversion, multi-offset conversion, elastic conversion, or four-dimensional conversion type of mechanism.

62. The method of claim 58, wherein kinematically linking the multi-fold and single-fold seismic domains includes applying a kinematic conversion mechanism of the same type as the dynamic conversion mechanism of the velocity model to the multi-fold seismic domain.

63. The method of claim 58, further comprising kinematically linking the multi-fold and single-fold seismic domains in the set of seismic data in a single-fold seismic domain related to the multi-fold seismic domain by a velocity model in time or in depth.

64. The method of claim 58, wherein kinematically linking the multi-fold and single-fold seismic domains comprises kinematically linking the multi-fold seismic domain point-to-point with the single-fold seismic domain.

65. The method of claim 58, kinematically linking the multi-fold and single-fold seismic domains comprises kinematically linking the multi-fold seismic domain surface patch-by-surface patch with the single-fold seismic domain.